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EXAMINER

ORTIZ, EDGARDO

ART UNIT

PAPER NUMBER

2815

DATE MAILED: 03/19/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.
09/343,293

Applicant(s)
Cheng Et.al.

Examiner
Edgardo Ortiz

Art Unit
2815



-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on Nov 27, 2001
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 25-60 is/are pending in the application.
- 4a) Of the above, claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 25-60 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are objected to by the Examiner.
- 11) ☒ The proposed drawing correction filed on Nov 27, 2001 is: a) ☒ approved b) ☐ disapproved.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

- 13) ☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).
- a) ☐ All b) ☐ Some* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- *See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

- 15) ☐ Notice of References Cited (PTO-892)
- 16) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 17) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s). _____
- 18) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 19) ☐ Notice of Informal Patent Application (PTO-152)
- 20) ☐ Other:

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DETAILED ACTION

This Office Action is in response to an amendment filed November 27, 2001 on which Applicant amended claims 25 and 42.

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371© of this title before the invention thereof by the applicant for patent.

Claims 25-36, 38-55 and 57-60 are rejected under 35 § U.S.C. 102 (e) as being anticipated by Wieczorek et.al. (U.S. Patent No. 6,037,232). With regard to Claim 25, Wieczorek teaches a gate electrode (207) and a source/drain terminal (213) aligned with the gate electrode, the source/drain terminal comprising an implanted region, a first silicide layer in the implanted region and a second silicide layer in the implanted region.

With regard to Claim 26, Wieczorek teaches a second silicide layer thicker than the first silicide layer.

With regard to Claim 27, Wieczorek teaches a second silicide layer spaced from a gate electrode.

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With regard to Claim 28, Wieczorek teaches another source/drain terminal (2130 aligned with the gate electrode, the other source/drain terminal comprising an implanted region and two silicide layers.

With regard to Claim 29, Wieczorek teaches a metal layer (217) that can be any number of different types of metal to form a silicidation layer. Therefore, it is inherent from the reference that the first and second silicide layers can comprise different metals suitable for a silicidation layer.

With regard to Claim 30, Wieczorek teaches first and second silicide layers comprising the same metal.

With regard to Claim 31, Wieczorek teaches a silicide layer comprising cobalt silicide.

With regard to Claim 32, Wieczorek teaches a silicide layer comprising titanium silicide.

With regard to Claim 33, Wieczorek teaches a silicide layer comprising nickel silicide.

With regard to Claim 34, Wieczorek teaches a silicide layer comprising cobalt silicide.

With regard to Claim 35, Wieczorek teaches a silicide layer comprising titanium silicide.

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With regard to Claim 36, Wieczorek teaches a silicidation barrier (211) adjacent to the gate electrode.

With regard to Claim 38, Wieczorek teaches a silicide layer (219A) adjacent the gate electrode.

With regard to Claim 39, Wieczorek teaches a silicide layer adjacent the gate electrode comprising nickel silicide.

With regard to Claim 40, Wieczorek teaches a silicide layer adjacent the gate electrode comprising cobalt silicide.

With regard to Claim 41, Wieczorek teaches a silicide layer adjacent the gate electrode comprising titanium silicide.

With regard to Claim 42, Wieczorek teaches a gate electrode (207) and a source/drain terminal (213) aligned with the gate electrode, the source/drain terminal comprising a first implanted region, a first silicide layer in the first implanted region, a second implanted region and a second silicide layer in the second implanted region.

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With regard to Claim 43, Wieczorek teaches a first silicide layer contained within a first implanted region.

With regard to Claim 44, Wieczorek teaches a second silicide layer that is thicker than the first implanted region.

With regard to Claim 45, Wieczorek teaches an implanted region thicker than another implanted region.

With regard to Claim 46, Wieczorek teaches an implanted region and a silicide layer spaced from the gate electrode.

With regard to Claim 47, Wieczorek teaches another source/drain region (213) terminal aligned with the gate electrode, the other source/drain terminal comprising two implanted regions and two silicide layers.

With regard to Claim 48, Wieczorek teaches a metal layer (217) that can be any number of different types of metal to form a silicidation layer. Therefore, it is inherent from the reference that the first and second silicide layers can comprise different metals suitable for a silicidation layer.

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With regard to Claim 49, Wieczorek teaches first and second silicide layers comprising the same metal.

With regard to Claim 50, Wieczorek teaches a silicide layer comprising cobalt silicide.

With regard to Claim 51, Wieczorek teaches a silicide layer comprising titanium silicide.

With regard to Claim 52, Wieczorek teaches a silicide layer comprising nickel silicide.

With regard to Claim 53, Wieczorek teaches a silicide layer comprising cobalt silicide.

With regard to Claim 54, Wieczorek teaches a silicide layer comprising titanium silicide.

With regard to Claim 55, Wieczorek teaches a silicidation barrier (211) adjacent to the gate electrode.

With regard to Claim 57, Wieczorek teaches a silicide layer (219A) adjacent the gate electrode.

With regard to Claim 58, Wieczorek teaches a silicide layer adjacent the gate electrode comprising nickel silicide.

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With regard to Claim 59, Wieczorek teaches a silicide layer adjacent the gate electrode comprising cobalt silicide.

With regard to Claim 60, Wieczorek teaches a silicide layer adjacent the gate electrode comprising titanium silicide.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 37 and 56 are rejected under 35 § U.S.C. 103 (a) as being unpatentable over Wieczorek et.al. (U.S. Patent No. 6,037,232) in view of Iwata et.al. (U.S. Patent No. 5,880,500).

Wieczorek, as stated supra, essentially discloses the claimed invention but fails to show, a silicidation barrier comprising silicon nitride. Iwata teaches a silicidation barrier (103a) comprising silicon nitride. Therefore, it would have been an obvious modification to someone with ordinary skill in the art, at the time of the invention, to modify the Wieczorek structure to include a silicidation barrier comprising silicon nitride, in order to serve as a barrier when a wafer is opened to air, cleaned and coated with a photoresist so that oxygen will not penetrate into a polysilicon

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film far deep inside, thereby eliminating oxygen components before a silicidation reaction take place. This results in a silicide film that renders excellent heat resistance and low resistance.

Response to Arguments

3. Applicant's arguments filed November 27, 2001 have been considered, but are not persuasive for the reasons stated in the body of the office action. Regarding the rejection of claims 25-60, Applicant argues that Wieczorek nor Iwata, whether alone or in combination with one another fail to teach or suggest "a source/drain terminal comprising an implanted region, a first silicide layer in the implanted region and a second silicide layer in the implanted region" or "a source/drain terminal comprising a first implanted region, a first silicide layer in the implanted region, a second implanted region, and a second silicide layer in the second implanted region". However, the examiner disagrees and notes to Applicant that Wieczorek teaches an implanted region (213) that consists of two layers thereby providing a first implanted region and a second implanted region which are placed on each side of the gate electrode (207) and first and second silicide layers (219B) in the first and second implanted regions, as clearly shown on figure (2E) of Wieczorek. Therefore, the claimed invention does not structurally or patentably distinguish from that taught by the prior art.

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Conclusion

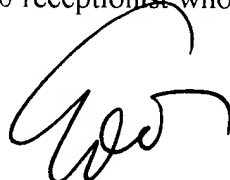
4. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Edgardo Ortiz (Art Unit 2815), whose telephone number is (703) 308-6183 or by fax at (703) 308-7722. In case the Examiner can not be reached, you might call Supervisor Eddie Lee at (703) 308-1690. Any inquiry of a general nature or relating to the status of this application should be directed to the Group 2800 receptionist whose telephone number is (703) 308-0956.

EO/AU 2815

3/16/02



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